STUDIO LIGHT

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EASTMAN PORTRAIT FILM NEGATIVE, ARTURA PRINT

By W. O. Breckon
Pittsburgh, Pa.

STUDIO LIGHT

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FILM ADVANTAGES IN FLASH-LIGHT PORTRAITURE

Film has decided advantages over plates in almost every branch of photographic work, but in none is the advantage more marked than in flash-light work.

The day has passed when photographers will depend entirely upon daylight, just as the day has passed when portraiture of the better sort is entirely a matter of studio sittings.

Practically every successful home portrait photographer is also a successful studio photographer, and many of these have found a simple and compact form of flash-light apparatus especially convenient for home portraiture as well as for dull-day studio sittings.

The great advantage of the flash-light is that it is powerful and instantaneous, while the disadvantage is that a light, powerful enough to be instantaneous, must of necessity be extremely concentrated and difficult to diffuse.

For this reason the flash-light gives harsh, contrasty results on plates. There is halation which produces chalky highlights, and this is due to reflection from the back of the glass which supports the plate emulsion. Special development with greatly reduced carbonate, which makes the process slow and tedious and the result lacking in brilliancy, is sometimes used to overcome this fault of the plate.

Many photographers, however, imagine that the contrast of the flash-light is an inherent fault, that the light is different or lacking in some quality and see no reason to believe that the trouble is in the physical nature of the material used.

Make two flash-light exposures, one on a plate and one on Eastman Portrait Film, and you will prove to yourself that the fault does not lie in the method

of lighting. The film will give a rendering of halftones and highlights that it is impossible to secure on anything short of the best non-halation plate, and even the non-halation plate will not equal film if the light is intense. There will be a considerable amount of light reflected from the back of the glass support, even if it is double coated and backed. This is practically impossible with film, because the transparent support is not thick enough for an appreciable amount of halation.

Professionals have said of film, "even direct sunlight seems to produce no ill effect on Portrait Film," that "the highlights retain their form and texture, etc.," which of itself explains why the film is especially suited to flash-light work.

A stream of sunlight coming through a window and a flash-light are analogous in-so-far as their effect on a plate is concerned. Out of doors there are so many sources of reflected light that there are seldom the contrasts that are encountered indoors, when either direct sunlight or flash-light is used. But where one does encounter these contrasts, Portrait Film results are invariably better than plate results.

It is not alone the non-halation properties of film, however, that make it so very desirable for flash-light work. Aside from the halation or radiated light that destroys the detail of highlights and makes them chalky, there is the possibility that the plate may not have the latitude or scale of gradation that will reach from the highest light to the deepest shadow of the brilliant lighting.

Portrait Film has the long scale that is especially suited to such work. All the brilliancy of the lighting is recorded. With a material having a shorter scale of contrast than that of the lighting, either the highlights or the shadows are blocked.

Commercial photographers have learned of these film qualities and have used Portrait Film extensively for flash-light work. Some of the finest interior work of recent years, both by flash-light and daylight, has been made on Portrait Film.

Home portrait and commercial workers are quick to see these film qualities because there are so many other film advantages that appeal to them. But film is now extensively used in studio work and will be used even more extensively by the best workers as the superiority of film results is demonstrated. In flash-light work especially, a trial of film is all that is needed to convince the studio worker that film will materially add to the quality of the work produced.

Make the negative on Portrait Film

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CHEMICAL POISONING

There has been considerable discussion of late in regard to chemical poisoning, partly because a great many new workers have been added to the photographic ranks in the last year or two, and partly because some photographers imagine that the scores of new developing agents that have made their appearance since the beginning of the war are really new in composition. As a matter of fact, they are practically all of them salts of paramidophenol, methyl-paramidophenol or diamidophenol, so there is really nothing new either in developers or in chemical poisoning. The following explanation and suggestions may be of value where chemical poison has been or is likely to be encountered.

Usually the trouble commences with itching and local reddening of the skin followed by swelling and the formation of water blisters, especially in the region of the nails and between the fingers, and in severe cases these blisters combine to form one large one, encircling the entire hand. At this stage with careful attention the blisters subside and in two weeks the skin begins to peel and the patient is well, though if the blisters burst, raw sores are left which heal with difficulty and there is danger from bacterial infection.

In all cases it is advisable to consult a physician as the condition of the health has an important bearing on infections of this nature. No specific eliminant appears to have been discovered, the usual "cures" in the form of ointments serving merely to allay the inflammation. An application of zinc ointment or the formula containing resorcin and ichthyol often recommended and bandaging of the parts affected is usually sufficient. After the skin has peeled, the parts affected are always supersensitive to the poison so that special precautions must be taken in future. There is no cure known which will prevent future attacks if the person is again exposed to the action of the chemicals which caused the poisoning.

There is some doubt among members of the medical profession as to whether the poison does enter the blood stream. In most cases the trouble is confined to the under layers of the skin on the hands, the chemical acting as a local irritant. There are cases on record, however, of persons who have handled quantities of these dry chemicals, have breathed the chemical dust, and the poison has broken out in different parts of the body. This is strong evidence that the entire blood stream may become poisoned. In ordinary dark-room procedure the poison undoubtedly enters the skin by the way of

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cracks formed by chapping or roughening of the skin by the action of the alkali in the developer. If the developer or other chemical solution is then allowed to dry on the hands, the salts crystallize within the pores and cause the skin to crack further, exposing the under layers and rendering possible the access of the chemicals to the blood stream.

Almost every photographic developer will cause trouble with the right person, and in this respect the personal element plays an important part. In the factories where photographic developers are manufactured, new comers appear to be particularly susceptible and employees are transferred to some other occupation if poisoning symptoms appear. Persons with very thin skins are particularly liable to be affected. Coal tar developers take first place as regards severity of action, though cases of poisoning have been known where the person handled pyro exclusively. On the other hand, some persons susceptible to one developer are immune to another.

The mode of access of the poison being known, preventive methods at once suggest themselves and may be tabulated:

(*a*) Never let the developing or other chemical solution dry on the skin, so that if solutions are being handled intermittently it is better to keep the hands thoroughly wet rather than dry them after only imperfectly washing them.

(*b*) When washing the hands, wash for two or three minutes in hot water until all soapy feeling disappears, otherwise the chemicals left within the pores will crystallize and cause cracking of the skin. The reason why most poisoning is caused by developers is because it is difficult to remove alkali from the skin by washing, especially if it is at all cracked. By bathing the hands in a weak acid solution, say 1% acetic acid, or by immersing them in the acid fixing bath before washing, the alkali is neutralized and the salt thus formed is more readily removed by washing.

(*c*) The use of a thin coat of vaseline on the hands will assist in preventing access of the solution within the pores of the skin, while rubber gloves, if used at an early stage, are an almost certain preventive. If vaseline is used it should be rubbed into the pores of the skin, after which the surface greasiness should be wiped off, otherwise the work will surely suffer from finger marks.

The usefulness of the above simple precautions is shown by the fact that during the instruction of over 5000 students at the U. S. A. School of Aerial Photography, Rochester, N. Y., only a single case of chemical poisoning was reported.

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THE MAN WHO MADE THE PICTURES

Some photographers who have never made a business of home portraiture think of the home portraitist as an intruder, as one who has broken into traditional photographic circles, while as a matter of fact he has merely broken out. He is a man who has seen the limitations of studio service and who has been broad enough to reach out and grasp a new idea rather than have it forced upon him.

Mr. W. O. Breckon of Pittsburgh is one of the pioneers of home portraiture. He recalls the first examples of home portraiture which he exhibited to other photographers with the apology, "made by a window in a home; unhandy outfit; difficult light, etc." To-day no apology is necessary. Experience with window lightings, Portrait Film and the Home Portrait Outfit have overcome former difficulties.

During a demonstration at a recent convention, Mr. Breckon was asked what class or style of work he liked to make, and his reply was, "Good, straight photographs—the kind that honestly pleases the people." He believes that expression sells 90 per cent. of the photographs made while the other 10 per cent. is a matter of salesmanship and possibly the photographer's reputation.

Believing this, he gives his sitter a natural and pleasing pose and makes a number of exposures to catch the various changing expressions. When a new position is given for almost every exposure there is the danger that the pleasing pose is found in one negative and the pleasing expression in another.

On being asked what he considered the chief advantage of Film over Plates, Mr. Breckon replied: "Did you ever go out by appointment to photograph the first grandchild, the finest baby in the world, with twelve 8 x 10 plates in the holders (and that's enough to carry with the rest of the outfit)? When you are about ten exposures along, Mother decides that it is just the time to get a picture of Grandma and Grandpa with the baby, also to have their portraits made separately.

"Not having enough plates, you make a trip to the studio and return with twelve more. But by this time baby has become restless, Grandpa is sleepy and Grandma has lost interest for the time in photography. The extra dollars hitched to that order are gone.

"I stopped that leak in profits with Eastman Portrait Film. I carry three to six dozen 8 x 10 Film for emergencies, no extra weight worth mentioning and I can reload in a clothes press when necessary.

"I take them where my cus-

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tomers want them taken and am more successful under trying conditions with films than with plates. When you are shooting against the light at the youngsters with their noses flattened against the window, watching for 'Dad', or the girls in the conservatory with sunlight streaming in through the plants, film helps you to get real quality in the deep shadows beneath the greens and also holds a clear, clean-cut outline of the figures against the strongest light."

In the Breckon studio you are strongly impressed with the harmony of studio arrangement, business methods, service, and high class workmanship. Our illustrations are excellent examples of Mr. Breckon's work on Portrait Film.

ADVERTISING CONTEST RESULTS

The pictures entered in the 1918 Kodak Advertising Competition have been passed upon by the judges and the prizes have been awarded for those pictures which, in the minds of the judges, presented the most forceful arguments for the sales of Kodaks or Kodak accessories.

There were fourteen prizes divided into two classes. The list of those who won the prizes follows:

CLASS A

First	William Shewell Ellis
Second	J. W. Weiseisen
Third	Edwin G. Dunning
Fourth	R. T. Dooner
Fifth	George J. Botto
Sixth	J. W. Weiseisen
Seventh	W. B. Stage

CLASS B

First	Florence N. Conaghan
Second	George H. Seip
Third	William C. Motteram
Fourth	George W. French
Fifth	James J. Ryan
Sixth	Edwin S. Culver
Seventh	John S. Neary

The judges were: E. B. Core, Photographer, Yonkers, N. Y.; L. á Hiller, Photographer, New York City; J. D. Ellsworth, Advertising Manager, American Telephone and Telegraph Co., New York City; Don M. Parker, Secretary, Century Co., New York City; W. R. Hine, Vice-President and General Manager, Frank Seaman, Inc., New York City.

LANTERN SLIDE BOOKLET

The first edition of a new booklet, "Lantern Slides—How to Make and Color Them," has just been received from the printers and will be of interest to every professional photographer who makes slides. The new methods of toning and tinting slides, worked out in the Eastman Research Laboratory, are especially interesting. The booklet is free at your dealer's.

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THE CHEMISTRY OF PHOTOGRAPHIC MATERIALS

Photography is so essentially a chemical process that every photographer should have an interest in the chemicals he uses and in the reactions which they undergo.

In this and several articles which will follow, including such subjects as the chemistry of development, the chemistry of fixation, etc., no attempt will be made to give an account of advanced or even elementary chemical theory.

We will, however, give the reason for the use of symbols in designating the chemical elements, as these symbols are universally used by chemists.

All substances are made by the combination in various proportions of a limited number of *elements* of which about eighty exist. These elements combine together in different proportions to form bodies of fixed composition which are termed *compounds*.

Thus, one volume of the gaseous element hydrogen combines with one volume of the gaseous element chlorine to form two volumes of the compound hydrochloric acid gas.

This combination can be represented by what is called a chemical equation. Thus, if we write H for hydrogen, Cl for chlorine and H Cl for hydrochloric acid, we can represent the above combination by the equation

H	+	Cl	=	H Cl
Hydrogen		Chlorine		Hydrochloric Acid

It will be seen that an equation such as that given above is really a short-hand method of stating what happens, the elements which take part in the combination being designated by letters. These letters which stand for the elements are called the symbols of the elements, and by their combination the compounds of the elements are likewise indicated.

The art of photography is founded upon the fact that the compounds of silver, and especially its compounds with chlorine, bromine and iodine, are sensitive to light.

The earliest photographs were made by coating paper with silver chloride and using this to form images by its darkening under the action of light, but the sensitiveness of the silver chloride was too slight to use it in this way for forming images in the camera.

In order to get results which require less exposure to light, advantage is taken of the fact that it is not necessary for the light to do the whole work of forming the image. It is possible to expose the silver compound for

only a short time to the light and then to continue the production of the image by chemical action, the process being termed "development."

Sensitive photographic materials therefore consist of paper, glass, or film coated with a sensitive layer which holds in suspension silver bromide or silver chloride. The sensitive layer which is coated on photographic material is called the *emulsion*. This emulsion consists of a suspension of the silver compound in a solution of gelatine. It is made by soaking gelatine in water until it is swollen and then dissolving it in warm water, gently warming and shaking the solution until all the gelatine is completely dissolved. The necessary bromide or chloride, *e. g.*, potassium bromide or sodium chloride, is then added to the solution and dissolves in it. Meanwhile the right amount of silver nitrate to react with the amount of salts used has been weighed out and is dissolved in water. The silver nitrate solution is then added slowly to the solution of gelatine and salt and produces in it a precipitate of the silver compound, the mixing being done in the dark-room, since the silver compound produced is sensitive to light. If there were no gelatine in the solution the silver compound would settle down to the bottom and an emulsion would not be formed, but the gelatine prevents the settling and keeps the silver compound suspended evenly so that as the silver is added a little at a time the gelatine becomes full of the evenly precipitated silver distributed through the solution. If this solution is coated on a support such as paper or film and then cooled, the gelatine will set to a jelly, and when the jelly is dried we get a smooth coating of dry gelatine containing the sensitive silver compound suspended in it.

Materials which are to be used with development must contain no excess of soluble silver and the emulsion must be made so that there is always an excess of bromide or chloride in the solution, since any excess of soluble silver will produce a heavy deposit or fog over the whole of the surface as soon as the material is placed in the developer. In the case of Solio paper, however, which is not used for development but which is printed out, a chloride emulsion is made with an excess of silver nitrate, this having the property of darkening rapidly in the light, so that prints can be made on Solio paper without development, a visible image being printed which can be toned and fixed. Solio paper can be developed with certain precautions, but only by the use of acid developers or after treatment with bromide to remove the excess of silver nitrate.

In the early days of photog-

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raphy prints were usually made on printing-out papers, but at the present time most prints are made by the use of developing-out chloride or bromide papers, which are chemically of the same nature as the negative making materials and which are coated with emulsions containing no free silver nitrate.

Negative making materials, such as plates and films, always contain silver bromide with a small addition of silver iodide. The different degrees of sensitiveness are obtained by the temperature and the duration of heat which the emulsions undergo during manufacture, the more sensitive emulsions being heated at higher temperatures and for a longer time than the slower emulsions.

If a slow bromide emulsion is coated upon paper, the material is known as *bromide paper* and is used for printing, and especially for making enlargements. The less sensitive papers which are commonly used for contact printing by artificial light contain silver chloride in the place of silver bromide.

In order to obtain silver nitrate the first step is to dissolve metallic silver in nitric acid. The silver replaces the hydrogen of the acid and forms silver nitrate, the hydrogen liberated decomposing a further portion of the nitric acid. The silver nitrate is crystallized out of the solution and obtained in colorless, transparent flakes.

Silver Nitrate for photographic use has to be extremely pure, and the metallic silver contains a small quantity of other metals such as copper and lead, from which it is necessary to free it. This is accomplished by recrystallization so that the silver nitrate is finally obtained in a perfectly pure form.

In order to ensure the purity of the silver nitrate which it uses, the Eastman Kodak Company prepares its own, and is the largest maker of silver nitrate in the world, using about one-twenty-fifth of all the silver mined in the United States. In order to be perfectly certain of the purity of this vital material, the company even manufactures the nitric acid used for dissolving the silver.

Silver nitrate is very soluble in water, the solution being strongly caustic so that it attacks organic material. Blackening of the skin, wood, cloth, and other similar substances, follows on exposure to light.

When a solution of silver nitrate is added to a solution of a bromide or chloride, reaction occurs and the insoluble silver bromide or chloride is precipitated. Thus, if we add silver nitrate to potassium bromide, the reaction occurs according to the following equation:

$$\underset{\text{Silver Nitrate}}{AgNO_3} + \underset{\text{Potassium Bromide}}{KBr} = \underset{\text{Silver Bromide}}{AgBr} + \underset{\text{Potassium Nitrate}}{KNO_3}$$

The potassium nitrate formed remains in solution, but if the solution is at all concentrated, the silver bromide is thrown down to the bottom of the vessel as a thick, curdy precipitate.

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The bromides and chlorides used in photography are chiefly the salts of potassium and sodium. Both the bromides and the chlorides are obtained from naturally occurring salt deposits, but whereas these deposits consist chiefly of chlorides, they contain only a very small quantity of bromide, and bromide is therefore a very much more expensive material than chloride.

The elements chlorine, bromine and iodine are all obtained from natural salt or from the sea, iodine being usually derived from certain sea weeds which extract it from the sea water and thus make it available in a concentrated form. Chlorine is a yellowish-green gas, very suffocating and poisonous; bromine gives dark red fumes which are even more noxious than chlorine and condense to a liquid, and iodine forms shining, black crystalline flakes which on heating give a violet vapor. The chief chlorides, bromides and iodides used in photography are the following:

Ammonium Chloride—Made from ammonia and hydrochloric acid, should have no smell, and when evaporated by heat should leave no residue behind. White crystals soluble in water.

Ammonium Bromide—Very similar to the chloride, which is the only impurity likely to be present.

Ammonium Iodide—Should consist of colorless crystals. Decomposes in light and is stained yellow by the iodine liberated. Very soluble in water and deliquescent. Soluble in alcohol.

Sodium Chloride—Ordinary table salt is fairly pure sodium chloride and a very pure salt is easily obtained. The pure salt is stable and not deliquescent. Soluble in cold water to the extent of 35%. Solubility increases very little on heating.

Sodium Bromide—Is a white salt, similar to the chloride but more soluble. Is generally pure but may contain chloride.

Potassium Chloride—White salt, very similar to sodium chloride.

Potassium Bromide—Occurs as colorless cubical crystals and is generally pure. Very soluble in water.

Potassium Iodide—Similar to bromide. Very soluble. May contain as impurities carbonate, sulphate and iodate, but is usually pure. Potassium iodide dissolves iodine, which is insoluble in water, and is therefore used to prepare a solution of iodine.

The gelatine which is used to hold the sensitive silver compound is a very complex substance which is obtained from the bones and skins of animals, and it has some curious and valuable properties. In cold water it does not dissolve but it swells as if, instead of the gelatine dissolving in the water, the water dissolves in the gelatine. If the water is heated, the gelatine will dissolve, and it will dissolve to any extent. It cannot be said that there is a definite solubility of gelatine in water in the same sense as salts may be considered to have a definite solubility. As more gelatine is added, the thicker the solution becomes. If the gelatine solution is heated, it will become thinner

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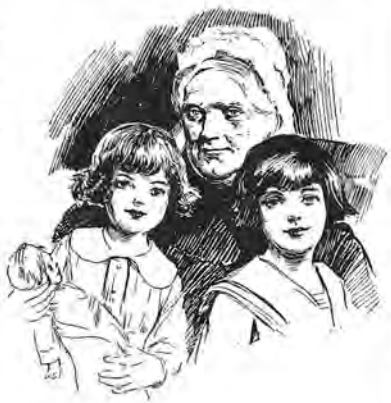
and less viscous when hot, and will thicken again when cool, but it will not recover completely. It will remain thinner than if it had not been heated, so that the heating of the gelatine solution produces a permanent change in its properties. If a gelatine solution is cooled, the gelatine will not separate from the solution in a dry state, but the whole solution will set to a jelly. If the jelly is heated again, it will melt, and a jelly can be melted and reset many times. During the treatment there will be produced a progressive change in the jelly, and if the process is continued too long, sooner or later the solution will refuse to set and will remain as a thick liquid.

Gelatine belongs to the class of substances which are called colloids, the name being derived from a Greek word meaning "gummy." When a gelatine jelly is dried it shrinks down and forms a horny or glassy layer of the gelatine itself, smooth and rather brittle. This dry gelatine when placed in water will at once absorb the water and swell up again to form a jelly. This swelling of gelatine when wet and shrinking when dry is of great importance in photography. When a photographic material with an emulsion made of gelatine is placed in water, the film will swell up and continue to absorb more water and swell for a long time, finally becoming soft and even dissolving, the extent to which this occurs depending on the temperature and nature of the solution in which it is placed. A small amount of either an acid or alkali will produce a considerable increase in the swelling, and since the developer is alkaline and the fixing bath is acid, both these solutions have a great tendency to swell the gelatine, especially when they are warm. In order to avoid difficulty from this course, gelatine emulsions have a hardener added before they are coated, gelatine being hardened and made more resistant to swelling by the addition of alum. Under ordinary circumstances no difficulty is experienced by the photographer owing to the softening of the gelatine, but when photographic materials are exposed to extreme temperatures, care must be taken in handling them. Hardening agents such as alum must be added to the fixing bath, and all solutions must be kept at the same temperature in order to avoid sudden contractions or expansions of the gelatine, which may result in detaching the film from its support or in the production of reticulation.

Until his ship returns—keep him happy with pictures from home.



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